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QUARTERLY PROGRESS REPORT  
TO 30 JUNE 1990

PHASE III CONTINUATION

Continuing Data Analysis of 1987 Data Sets  
in Government Fiscal Year 1990

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## 1 INTRODUCTION

This report documents project progress made up to the end of June 1990 of the Phase III Continuation. At the time of writing, much of the work described in this report as currently in progress is complete. Where this is the case, it is indicated by the use of text in parentheses.

## 2 AIMS

In the previous quarterly report detailing work up to 31st March 1990, the following aims for this quarter were outlined. These are reiterated briefly below.

### 2.1 Task 1

Technical liaison was to be carried on between SAIC, Dr Wadhams, and Dr Comiso with regard to an outline plan for Task 5. Also to be continued was the analysis of results from the classification of the underice environment with the view of producing supplementary reports and a paper for submission to an appropriate journal. A supplementary deliverable entitled: "THE AUTOCORRELATION FUNCTION AND POWER SPECTRUM OF THE UNDERSIDE OF ARCTIC SEA ICE", was issued on 10th April, (see "Quarterly Progress Report to 31st March 1990").

### 2.2 Task 3

Further analysis of floe, ridge and lead data was to be carried out with a view to producing a report and output suitable for submission. The major Task 3 deliverable, a Data Pack was to be completed and issued after suitable security clearance.

### 2.3 Task 4

Following the classification of the region of SAR imagery corresponding to the region of Sidescan studied, statistics were to be produced from the classified and digitised SAR data. These were to enable a comparison between the relative amounts of the ice types seen by different sensors. A feature-by-feature comparison was also to be undertaken in order to produce a two-dimensional ice type transfer function, as described in the Scope of Work.



### 3 WORK UNDERWAY BETWEEN 1st APRIL AND 30th JUNE 1990

During this period, three tasks were underway. Progress in Tasks 1, 3 and 4 is outlined below.

#### 3.1 Task 1 Technical Liaison

Task 1 spans the entire year but has no specified milestones. Work under Task 1 was ongoing throughout the quarter. SAIC has in the past issued supplementary deliverables associated with this task and intends to carry on in doing this.

Technical liaison has been continued between SAIC/Cambridge, Dr Wadhams and Dr Comiso. Dr Wadhams and Dr Comiso discussed project progress and possible Task 5 effort during the Algorithm Meeting which they attended in April of this year. Dr Wadhams produced a strawman proposal for Task 5 under SAIC's direction. In early June, Dr Sear visited Raleigh, NASA and ONR to discuss project progress and objectives. (Further discussion between SAIC and Dr Wadhams has revised Task 5 objectives.)

Ongoing work: report and paper preparation and technical liaison continues.

#### 3.2 Task 3 Collocated Data Set / Sidescan Analysis

Task 3 started at the beginning of this year and was due for completion at the end of April. A new speed-time log for the Upward-looking Sonar data had to be produced to tie more accurately the Upward-looking Sonar with the Sidescan Sonar data. This was completed in June. Unfortunately, technical equipment problems at SAIC Cambridge have delayed the copying and distribution of the tapes containing the Data Pack. Dr Sear contacted FOSM seeking to obtain a security clearance for the Data Pack and associated documentation.

All analyses of Sidescan Sonar imagery was completed by 30th June and a paper was begun, for submission to Progress in Oceanography. This paper includes discussion of our analysis methods and results of the Sidescan feature validation with Upward-looking Sonar. It also includes discussion of along track feature associations, ridge spacing and orientation and lead spacing. A supplementary deliverable entitled: "REPORT ON STATISTICS OF ASSOCIATIONS OF FEATURES GENERATED FROM SIDESCAN

SONAR ANALYSIS", was issued on 28th June, as a precursor to the paper being prepared. This report is included here as Appendix I.

Ongoing work: awaiting security clearance for the Data Pack.

(A clearance of 'UK RESTRICTED' was assigned and the Data Pack was completed and dispatched along with documentation on the 14th of August, to ONR, via BFPO2. Task 3 is now complete.)

### 3.3 Task 4 Sidescan to SAR Ice Type Transfer

Following the digitising of the Sidescan Sonar data, the region of the SAR image corresponding to the Sidescan swath was extracted, straightened and a hard copy produced. This was then classified according to a scheme laid out in the February monthly progress teletext. This classified feature map has now been digitised such that it is in the same format as the digital Sidescan data enabling direct overlaying of the two data sets. Both of these data sets are due to be output as part of the Task 3 deliverable. Using the digitising procedure used to process the Sidescan data, we have generated similar statistics for the SAR data. These have enabled us to produce comparative statistics to enable the relative effectiveness of the two sensors to be compared.

Analysis of the two near-simultaneous data sets has been carried out on a qualitative basis. The quantitative feature-by-feature comparison, as described in the Scope of Work, has not been completed but is being considered as a high priority as a Task 5 effort.

Ongoing work: work is continuing to characterise the digital SAR maps. SAR ice type statistics are being derived and will be reported in later monthly report(s). Details of the analysis of SAR statistics are to be reported to ONR in a supplementary deliverable.

### 3.4 Task 5

This task was not started by 30th June 1990.

Ongoing work: a manual feature-by-feature analysis is now being performed to find the most likely SAR feature type corresponding with Sidescan ridge keels. The results of this analysis will be

issued as a supplementary deliverable probably around mid-September.

### 3.5 Task 6

There has been some liaison with SAIC Raleigh, who are responsible for this effort. It is understood that SAIC Cambridge should forward SAIC Raleigh relevant data sonar data and reports. At the end of June a pack of reports and other information was forwarded to SAIC Raleigh.



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